

FACTS CONCERNING FEDERATION

AN ADDRESS TO THE ALUMNI ASSOCIATION OF VICTORIA
UNIVERSITY AT THEIR ANNUAL MEETING, ALUMNI
HALL, COBOURG, ONT., MAY 14TH, 1889.

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JAMES ALLEN,

President of the Alumni.



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Facts Concerning Federation.

When the question of how to begin a university was upon the minds of the trustees of Johns Hopkins, the president, Dr. Gilman, said, "Enlist a great mathematician and a distinguished Grecian; your problem will be solved. Such men can teach in a dwelling-house as well as in a palace." Dr. Harris, professor of chemistry in Amherst, in conversation with me not long since respecting the needs of a university, remarked, "The first and greatest need is men. Get strong, well qualified, thoroughly competent men for professors, and you have your university. You can erect buildings, and add apparatus and equipment as you get the means. All other university needs sink into insignificance compared with the great need of strong men in the faculty."

The removal, therefore, of a strong man from our faculty is the most serious loss that we can sustain. To our great regret Dr. Haanel has resigned his position as Dean of the Faculty of Science, to accept the chair of Theistic Science in the Syracuse University. Dr. Haanel has had charge of our Science Department for sixteen years. To him we owe the erection of Faraday Hall. He gave a

general impulse to scientific teaching in this country ; and, though hampered much by the lack of apparatus, which could not be purchased on account of our poverty, he has done such efficient work that students have left wealthier institutions to seek the degree of Victoria in Science. Dr. Haanel's gifts as a teacher are very great, and the graduates and undergraduates of this university have a keen sense of obligation for the intellectual benefits received from him. He is known among scientists chiefly by his discovery of a new method of blow-pipe analysis. He will be remembered by his students with affection and respect, on account of his strong desire to be serviceable to them ; his quick appreciation of their difficulties ; his steady purpose to be thorough himself, and to make his students thorough ; his steady purpose in all his thought, experiment and communication to make his students men.

The course pursued by the authorities of Victoria in selecting from our Canadian universities the best graduates, who have given proof not only of scholarship but of exceptional ability as practical teachers, and encouraging them to go abroad to prepare for professorships, has been productive of the best results. The Board of Regents has, fortunately, secured one of these men, Dr. Coleman, to take charge of the Science Department. Dr. Coleman carried away the highest honors of his Canadian Alma Mater in 1876. He demonstrated his ability to teach by several years' service in the Colle-

giate Institute, Cobourg, pursuing at the same time post-graduate studies, under the direction of Dr. Haanel. His degree of Doctor of Philosophy was won by close study and severe examination, after several years' residence at Breslau University, Germany. Since 1883 Dr. Coleman has ably performed the duties of professor of Natural History and Geology. His great and varied information, his rare ability as a teacher, the excellent work done by him in the past, guarantee his fitness for the position he is to occupy. Professor Horning has applied for, and obtained, leave of absence. He intends to spend several years in availing himself of the advantages of residence and study in the best universities of Europe. Mr. Petch, who is now in Europe, will enter next year upon the duties of Assistant Professor of Modern Languages. He is well furnished for his work. Our late Chancellor, Dr. Nelles, in an address delivered in 1883, made the following reference to Professor Bell: "When, not long since, an adjunct professor was required to assist, both in ancient and modern languages, the Board secured the services of a high honor man from the University of Toronto, and we have great reason to congratulate ourselves on the selection then made." During the last four years Professor Bell has continued his studies in Europe. He is expected to return to the service of the University next fall, well prepared to advance the branch of knowledge to which he is devoted. Although Dr. Workman has been publicly welcomed by the

Faculty and students, I may be permitted to congratulate you on his return, with the highest academic honors from Leipsic University. His valuable book on "The Text of Jeremiah" has received high praise from distinguished scholars. "The author thereby contributes to the science of Biblical criticism a work of valuable and lasting service," is the testimony of Professor Franz Delitzsch. The Andover *Review* says: "As a manual of the newest methods and principles of textual or lower criticism it is of a high order. As a light upon the text of Jeremiah, it has no rival." The ripe scholarship, which has brought Dr. Workman such distinction abroad, will be of great service to our University. While we greatly regret the removal of Dr. Haanel, we are glad to see the evident determination of the Board of Regents to supply the Faculty with the great requisite of a university—strong men.

The present age is passing through a revolution with respect to the subject-matter of education. Change in the subject-matter of education has brought corresponding change in university organization, equipment and methods. But we are still in the forming period. We have reached the point of dissatisfaction with everything we have had. We have not reached the point of certainty as to what we would have. In university work we are still in the experimental stage.

In times of uncertainty respecting university methods, men who have charge of great financial

and educational interests should move cautiously. Before making violent change in a system, the result of generations of experience, we should endeavor to ascertain clearly whether the new system will do for us all that its advocates predict.

Unfortunately, patient investigation has not marked the federation movement. When this question came upon the Methodist Church and the Board of Regents, we were not familiar enough with university organization and methods to exercise sound judgment. With one exception, the governing bodies of the universities of which I have any knowledge are divided into committees, each committee having charge of some special department of university work—such as Faculty, Library, Museum, Apparatus. It is the duty of each committee to inform itself thoroughly respecting its own department, and report to the Board. Every member thus obtains by personal investigation intimate knowledge of his own department; and, through the reports of committees, a general knowledge of the needs and efficiency of the entire university. This method has not been pursued in Victoria. Our system of transacting business has not required from the members of the Board more than superficial knowledge of the institution under their care. So far as I am aware, but two annual reports have ever been presented to the Board by the Chancellor of the University. This question found me, for one, without clear knowledge respecting the work of the College, of whose

governing body I am one of your representatives. My impression is that other members of the Board, as well as myself, did not know what was needed respecting Faculty, Apparatus, Library, and other appliances, in order to make our own college work thoroughly efficient. Federation brought before us other questions to which many had paid no attention, and which could not be decided rightly without patient study—such questions as the distinction between university and college work ; the endowment requisite for post-graduate work, the endowment requisite for undergraduate work ; the apparatus required for post-graduate work, the apparatus required for undergraduate work, and the cost of each ; the cost of a library for post-graduate work, the cost of a library for undergraduate work ; respecting the merits of the fixed course, and of the various forms of what is known as the elective system ; the best location for a university ; the effect upon the country of centralization ; the number of students which can be taught with advantage in one college ; whether there should be few colleges with many students in each, or many colleges with fewer students in each. These and kindred questions require patient, impartial study before sound judgment could be exercised respecting Federation.

This question was first discussed in the Board of Regents, on the 9th of January, 1885. It was argued by the advocates of Federation that the condition of our finances would not warrant the

maintenance of an independent university. No detailed statement was given, and I was without the definite information which would enable me to form an independent judgment. The arguments appeared to me to be convincing, and I voted for the resolution. The next time the question came before the Board, on May 21st, 1886, the very men who advocated Federation so strongly on financial grounds, argued as strongly against it for the same reason, viz., that the condition of our finances would not warrant our entrance into Federation. It was shown by Dr. Burwash that for \$150,000 less than Federation would cost, we could provide for an independent university an equipment superior to anything then in the Province. I was still without definite information. As in the former case, the argument appeared clear and convincing, though it pointed to the opposite conclusion, and I voted for Independence. As I gave that vote, I felt humiliated and ashamed at finding myself without the definite information which would enable me to form an independent judgment. As one of your representatives on the Board, I felt that I ought not to know so little about university organization and equipment as to be compelled to take my opinions from two or three men. From that moment I set myself to the patient and earnest study of the question, and I found that Dr. Burwash's estimate was upon the whole accurate, viz., that Independence in Cobourg, with an equipment superior to anything then in the

Province would cost \$150,000 less than Federation. You will find this estimate on page 199 of the *General Conference Journal*.

As other questions came up, I sought information which would enable me to understand them from every reliable source that was open to me. The most enlightened instructors and administrators have been good enough to reply to my letters, and to grant me personal interviews. During the past year I have visited the following universities: Rochester, Syracuse, Cornell, the University of Pennsylvania, Johns Hopkins, Columbia, the University of the City of New York, Boston University, Amherst, Yale and Harvard.

My inquiries were made, first, in the direction of university organization and government; the constitution of a board of regents, how elected, how vacancies should be filled, the qualifications members should possess; the best methods of obtaining information which would enable members to discharge their duties; the constitution, powers and duties of the senate, the methods of appointing professors, the powers of the faculty, the special functions of the various officers, the relation of these three bodies—Board, Senate and Faculty—to one another. The importance of clear ideas on these questions must appear from the differences of opinion among ourselves respecting the powers of Advisory Committee, Board, and Senate.

My inquiries were made, secondly, respecting

university methods, equipment and work, and addressed to men whose right to speak with authority on these questions is recognized by the continent. I wish you to compare with their views some of the representations made by the Federationists.

Take the statement that Federation is to give us a university second to none upon the continent, with provision for post-graduate work such as is now found only in the United States and in Europe. This statement has not been made, so far as I know, by any one having authority to speak for Toronto University or for the Provincial Government. The nearest approach to an official utterance is an editorial in the *Globe*, from which I will now quote: "The whole subject," viz., Federation, "becomes a matter of the first consequence, if only it is possible under such a scheme to secure a university second to no other at any seat of learning on the continent. And because we desire to see Ontario occupying a first place in higher education among the states and provinces of this continent, and providing for her sons the best instruction procurable in the world of Science and the Arts, we favor a scheme for a federation of the colleges."

It is stated by Dr. Burwash in his article entitled, "The Present Aspects of University Federation," published in the *Methodist Magazine* of November, 1887, and circulated in tract form by the Secretary of Education, that by federation we will gain "a

first-class university, scarcely inferior to any on the continent, and for which we might otherwise have to wait for two full generations to come," and that provision now to be found only in the United States and in Europe will be made for post-graduate students.

One of our General Superintendents, Dr. Williams, whose opinion carries great weight on account of his personal character and commanding position, in speaking of the advantages of Federation, cited the case of Dr. Workman. "Why," said he, substantially, "should we refuse to enter into Federation when by accepting it we shall have a university in Ontario where such a man as Dr. Workman can find advantages for advanced study without going to Germany? Why should not the University of this Province have the credit of educating a man who can write a book giving the world something new about Jeremiah? Let the University of our own country have the honor, instead of giving it to Leipsic."

If Federation will give us such a university as Leipsic, or Johns Hopkins, by all means let us have Federation; but we must be permitted to examine the claims made by its advocates for the proposed university professoriate.

A clear distinction between post-graduate and undergraduate work will aid us in coming to a right conclusion. The following definition of a university by the President of Johns Hopkins contains the distinction: "A university is a body of

teachers and scholars, a corporation maintained for the conservation and advancement of knowledge in which those who are thoroughly prepared for higher studies are encouraged to continue under competent professors, their intellectual advancement in many branches of Science and Literature. In this society we recognize two important grades, (a) the collegiate students who are aspirants for the degree of Bachelor of Arts, to which they look forward as a certificate that they have completed a liberal course of preliminary study; and (b) the university students, including the few who may be candidates for a higher diploma, that of Doctor or Master (a certificate that they have made special attainments in certain branches of knowledge), and a larger number who, without reference to a degree, are simply continuing their studies for varying periods. Corresponding to the wants of these two classes of students, we have two methods of instruction. The rule of the college which provides discipline, drill, training in appointed tasks and for definite periods; and the rule of the university the note of which is opportunity, freedom, encouragement and guidance in more difficult studies and pursuits." From this distinction between the university and the college you perceive that, speaking broadly, all work leading up to and ending in the baccalaureate degree is college work. University work is the pursuit of some special branch or branches, which may be continued to any length. This special work cannot be pursued to the best advantage, except in its

elementary parts, until the foundation for liberal culture is laid in the college. Look at some examples which show the difference between post-graduate and undergraduate work.

In Clark University, which is to be opened in Worcester, Mass., next October, for post-graduate work only, individual arrangements may be made, and an independent room, and even special apparatus and books, provided, that students of sufficient training, who wish to devote their time to particular lines of study or research, may pursue their investigations. In the Department of Chemistry alone a large laboratory of fifty rooms is furnished with apparatus on the amplest scale. Now, this is called university or graduate work. It is best known among us as post-graduate work. To provide for advanced teaching of this kind involves enormous expense. Some of the universities of the United States are very wealthy. Johns Hopkins has an estate within Baltimore city limits which, when surveyed, will furnish fifteen or sixteen miles of street frontage. This estate will add largely to its already large income. Other universities have immense endowments; but most of their means are expended on post-graduate work. But the college work, or what we call undergraduate work, is simple, elementary, and comparatively inexpensive. Apparatus and chemicals for a course on the fundamental principles of chemistry, such as that taken by our pass men, may be purchased for \$298.77. This estimate is

made by Eimer & Amend, of New York, and given by Professor Cooke, Director of the Chemical Laboratory of Harvard University. Professor Cooke adds to this estimate the following note: "The above estimates are all on a very liberal scale. When economy is necessary, the teacher can largely reduce the cost by devices of his own." Dr. Haanel states that, in addition to what we have now in our Laboratory, \$1,000 will purchase all the apparatus in chemistry that could be used by the most brilliant honor man in undergraduate work. There is a vast difference between the chemical laboratory of Clark University, with its fifty rooms furnished with the most expensive apparatus, and the chemical laboratory of Victoria College, with an additional \$1,000 worth of apparatus. But the one is as well furnished for undergraduate as the other is for post-graduate students. An undergraduate student in chemistry could no more use the expensive apparatus of Clark University than a boy could read Homer before he knew a letter of the Greek alphabet. As fifty rooms furnished with the most costly apparatus is to one room supplied with apparatus costing \$1,000, so is the expense of post-graduate to the expense of undergraduate work. Now, the expense involved in these two classes of work is confounded by many. They hear of the vast amount required for university—that is, post-graduate—subjects, and they apply it to collegiate or undergraduate subjects. For example, the editor of the "Meth-

odist Magazine" reads that the University of California has a telescope which cost \$250,000, and straightway he finds upon it an argument for Federation. Methodists, he says, would not be satisfied to give their sons anything less than the best. The best is a very expensive thing. We must enter into Federation that we may have nothing less than the best, viz., a telescope costing \$250,000. The Editor forgets that such a telescope is not necessary for undergraduate instruction, but is used mainly by specialists who devote themselves to original investigation, and whose object may be to announce the existence, and to analyze the materials, of some luminous point which may be seen two or three times in the course of a century when the weather is favorable. Professor Swift, Director of the Warner Observatory, showed me a telescope which he calls his "comet seeker." This telescope, which cost \$300, he has used for thirty years, and with it has made many of the discoveries by which he is so widely known among astronomers. Such a telescope would answer as well as the more costly instrument for the instruction of students who do not know the visible motions and the known relations of stars that can be seen by the naked eye.

An observatory has been erected at Johns Hopkins, and a telescope, with all the necessary accessories and other appliances, provided at very great expense. Professor Newcome, who was for many years connected with the Naval Observa-

tory at Washington, and who is now Superintendent of the United States Nautical Almanac, has been engaged as Professor of Astronomy. Professor Newcome lectures to four or five students, and I was told that there is one student who intends taking the Doctor's degree in Astronomy as his principal subject. Now, undergraduate students in Astronomy could no more profit by the instruction given by Professor Newcome to his post-graduate students, than a boy who knew nothing of multiplication could calculate an eclipse. For post-graduate work, as has been shown in the case of Johns Hopkins University, a well-appointed astronomical observatory is absolutely necessary for proper and practical instruction in Astronomy; but the students taking such subjects are usually very few. For collegiate instruction, a costly telescope with its appurtenances is, to a great extent, a piece of useless apparatus; for, aside from the fact that the students are not far enough advanced to handle such an instrument, it is evident that each individual of the class would have to look through the telescope, and, where the class is large, the valuable time of the professor would be frittered away to no purpose. By throwing any group of stars or nebulæ upon the screen, the whole class can view together the objects to which their attention is directed by the lecturer, and the lecturer can proceed without the confusion which must necessarily result when fifty or more students are crowding to the eye-piece of the telescope to get at best only

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an unsatisfactory and partial view. Hence, with a telescope costing \$250,000, such as the Methodist Magazine proposes, we have the proportion: as \$250,000, cost of telescope, is to \$350, cost of apparatus for throwing astronomical objects of instruction on the screen, so is the expense of post-graduate to the expense of undergraduate work.

Now, so far from Federation giving us a university second to none upon the continent, with post-graduate courses, such as are now provided only in the United States and in Europe, it is not proposed to do this class of university work at all. The Minister of Education nowhere hints at such a thing. It is true that the present University Faculty is to be divided; one part will be known as the Faculty of University College, the other part is to be called the University Professoriate. The University Professoriate is to provide teaching in certain branches for the students of all the federating colleges. But the work done by the colleges and the work done by the University Professoriate is of the same grade. *It is all collegiate work, undergraduate work, work preliminary to the B. A. degree. The University Professoriate does no university, that is, post-graduate, work.* That Federation will give us a university where men can be educated who wish to become such specialists as Dr. Haanel, Dr. Coleman, Dr. Workman and Dr. Bell is a dream, without the shadow of a promise from the Government to rest upon.

THE ELECTIVE SYSTEM.

What is known as the Elective System must be clearly understood before we can decide wisely upon Federation. Dr. Burwash sets forth its importance in a reply to Dr. Sutherland, published in the *Mail* of December 22nd, 1888. He says: "Five years ago the new university departure of specialization for the degree of B. A. was on its trial in this country. Many of us, thought the old, all-round course was better. I was one who believed in the conservative curriculum. * * * * If Dr. Sutherland could bring back to this country and to the whole civilized world the old-time fixed, balanced curriculum for the B. A. degree, I would fight again by his side for our independence." Now, before we surrender our independence because we have no longer the old-time fixed, balanced curriculum, which I have no wish to bring back, we should inquire into the character and extent of the specialization for the degree of B. A. which is demanded by our age, and by what Dr. Burwash calls the "trend" of the times. Which involves the greater expense, Federation or an independent college, supplying such means as the age demands for special study for the B. A. degree? The custom of the chief American universities, and the views of the ablest educators among them, will assist us in coming to a conclusion.

The elective system, as it is pursued in the various universities in the United States, is gener-

ally carried out in one of two ways. It either gives the student a choice between various courses of study, which are so arranged as to secure a liberal and not a special education ; or, secondly, it allows him in a specified course to add to a nucleus of studies absolutely required a certain number chosen with reference to his aims and tastes. In Harvard, however, the college is practically abolished. The freedom of German university life is allowed in undergraduate studies. Two things are fixed by Harvard for the degree of B. A. First, the amount of work ; and, secondly, the quality of the work. The student is allowed perfect freedom in the choice of studies. He may study but one subject all through his undergraduate course ; or he may study a great many subjects. This is described somewhat sarcastically by the university men who disapprove of it as, " the free lunch system of Harvard." If specialization for the degree of B. A. is to be of this character, then no college in this country is competent for the work. But is it to be of this character ? I will put before you some of the views of the chief university men on this continent, and you can draw your own conclusion.

President Gilman, of Johns Hopkins University, was good enough to grant me several interviews, and converse with me fully and freely upon the questions concerning which I was seeking information. He said that, in his opinion, a sharp distinction should be made between the legitimate

work of a university and the legitimate work of a college. Students at their college stage require positive training in physical, intellectual, moral, and religious action. They are forming the habits which will govern their future lives, and they require the discipline which comes from adherence to established methods of instruction and from the example of wise and faithful teachers. Johns Hopkins University is organized upon the idea that university instruction is distinct from collegiate instruction, which it presupposes. The freedom of choice permitted by some universities to their undergraduates must be injurious. Johns Hopkins University does not allow students to make a choice of studies, but offers them a choice of one out of seven parallel courses which are so arranged as to secure a liberal and not a special education. Ordinarily two parallel courses in undergraduate work are sufficient. If he could have but two parallel courses, one classical and one scientific, he would still maintain an independent college, and add other courses in time. He spoke in complimentary terms of the work done by denominational colleges, commending especially the religious element. He also made, as nearly as I can recollect, the following comparison between religious and intellectual liberality: When denominational colleges apply to me for a professor and say, "send us a Presbyterian, or a Methodist, or a Ritualist, or a Baptist, or a Unitarian," I understand the request, and sympathize with it. Parents want their boys

at the most susceptible period of life, under the control and discipline which is in harmony with their own religious belief until their characters are so far formed that they are competent to choose for themselves. And I no more value that religious liberality, which says, "See, one of our professors is a Methodist, another a Quaker, another a Ritualist, another a Presbyterian, another a Unitarian, and another nothing," than I value that intellectual liberality, which says, "We allow our men to specialize; they can take what studies they please." "If this university"—I now use the words of President Gilman—"if this university has rendered any service to the country, it is due, I think, to the persistent maintenance of the idea that the traditional American college should be perpetuated in its essential characteristics; while beyond its curriculum, the most generous opportunities for the prosecution of all branches of learning should be offered to those who intend to pursue the learned professions, or who aim to be teachers, or who wish to widen their culture and enlarge their minds."

Dr. Harris, whom some of you remember as one of the ablest professors that was ever upon the staff of this college, and who went from Victoria more than twenty years ago, to take the chair of Chemistry in Amherst, said, in reply to my inquiries, that when he went to Amherst he began to fight for the introduction of options. At first the entire Faculty was against him, but in time he won the day. When Amherst abandoned the fixed course,

the other New England colleges soon followed her example. He has observed the elective system carefully, and while they have gained a little by adopting it, they have lost a great deal. Of one thing he is certain that they are not making as strong men as they made when they had the fixed course. This he considers not so much the fault of the elective system, as the fault of the professors, who do not work it properly. You cannot, he said, turn strong men out of a college, unless you make them work hard. The subjects taught are important, but the principal thing is work, work. You must drill students until hard work, application, becomes the habit of their lives. Where students are allowed freedom of choice, most will select that which is easy. Where they are allowed to choose between professors, professors are apt to lighten the work of the students in order to acquire popularity, and give their own departments an appearance of prosperity. The elective system has been carried to an extreme, especially by Harvard; but the reaction has already set in, and the signs of the times indicate that there will be less specialization in the future than there has been in the past. His own view is that for the freshman year, and the first term of the sophomore year, the course should be fixed. During the rest of the undergraduate work he would have, not optional studies, but, optional courses.

Dr. Chandler, Dean of the School of Mines, of

Columbia University, approves of parallel courses. A student in the School of Mines may choose one of the appointed courses, but having made his choice he must confine himself to that course, and take all the studies it contains. He would no more allow an undergraduate student to pick and choose a study here and there, than he would allow a child to pick and choose its food. "There," said he, pointing to a student who happened to come in at the time, "is a fellow who, no doubt, thinks he knows what he should study better than I do; but I say that he does not. A student comes to me, for instance, and says that he wants to take a certain course, but one of the studies in the course will be of no service to him in the profession which he intends to adopt, and asks to be allowed to substitute something else for it. I reply, young man I have taught for twenty-five years, and I am not fit to be your professor if I do not know what you ought to study better than you do yourself. Here is our bill of fare. It is carefully selected—selected with more skill than you possess. If it does not suit you, you must go somewhere else, you can get no free lunch here."

President Adams, of Cornell, would take the students a year earlier from the high school and make the college course but three years in length, ending in the B. A. degree. This course he would have absolutely fixed, allowing no freedom of choice until advanced studies are taken up afterward in the university. Substantially the same view is

courses. choose one made his course, and would no pick and could allow 'There,' opened to no doubt, better than student he wants studies in the pro- asks to be for it. I twenty-five sor if I do r than you s carefully n you pos- t go some- where."

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held by the Hon. A. D. White, ex-president of Cornell University. Provost Pepper, of the university of Pennsylvania, would not take the student from the high school any earlier, nor would he shorten the course ; but he would have the studies of the two first years absolutely fixed, the remaining two years he would allow the student to specialize. Chancellor Sims, of Syracuse University ; Chancellor Hall, and Vice-Chancellor McCracken, of the University of the City of New York, would have but few options. Professor Chittenden, of Yale, gave substantially the same opinion as that given by President Gilman and Dr. Chandler. I found Dr. Drisler, acting-president of Columbia University, especially decided in his views. He would allow no specialization at all, until the last year. Then he would permit a student to choose special studies bearing in the direction of his life work ; but only to a limited extent.

This part of my subject may be fitly closed with the words of President Dwight, of Yale. I was so unfortunate as to obtain no interview with President Dwight, who had left New Haven the morning I arrived ; but his views on the elective system are set forth clearly in the following words which I copy from his annual report : "One of the gravest evils of our national life in the immediate future, as it seems to me, is likely to be the one-sidedness of education—the fact that men are to have one line of thought only, moving within the sphere of their own single profession or business, and are to

have their idea of the mind's life limited to its practical results, and not enlarged to the comprehension of what the mind is, in and for itself. The signs of this coming evil are already apparent in our public and popular life, and I cannot but think that the subject which it suggests is worthy of most serious consideration on the part of all whose home and work are in our various seats of learning.

* * * * * We open two lines of study, which are carefully and thoughtfully arranged, and which lead to two different bachelors' degrees—one of them making provision for that course of study which has been handed down from earlier times, with such additions as in this age are required to fit any person of liberal education for his mature life; the other furnishing instruction along those lines which especially lead to scientific research, and to practical working in the field of the great material interests of the country. In both alike a common curriculum of study is required of all in the earlier year or years, while in the later years a greater freedom of choice is allowed, yet in every case with a movement along some definite and prescribed line."

The men among ourselves who have contended for the views advanced by such educators as the presidents of Yale, Columbia and Johns Hopkins, and who would now surrender our independence because, in their opinion, such views are not likely to prevail, are in the unhappy position of discouraged soldiers who desert to the enemy just when

victory is within their grasp. They seem determined to contend always against the prevailing fashion. They fight against the fashions of the hour during the hour, and yield to them when the hour is past and the fashions are old.

EXPENSE OF INDEPENDENCE AND EXPENSE OF FEDERATION COMPARED.

At this juncture it would be well to compare once more the expense of Independence with the expense of Federation. In what particulars is the maintenance of an independent college doing full undergraduate work said to be beyond our power? The demand of the age for specialization; a library thoroughly furnished for what is said to be the modern method of the study of Languages, Literature, History, Philosophy and Civil Polity; the equipment and maintenance of the Science Department; the expense involved in these three things is said to be beyond our reach. Let us see. In the estimates presented by Dr. Burwash to the last General Conference, we have, in addition to our present endowment, for Independence in Cobourg, \$300,000; Confederation, \$450,000. This estimate of \$300,000 provides for the addition of six professors, and Dr. Burwash adds the following significant note: "In submitting for consideration these estimates, we must call attention to the fact that even by the addition of four professors to the present staff instead of six, as contemplated in the estimates, we would stand as regards efficient

equipment equal to anything in the Province to-day."

It is said that we cannot maintain our independence on account of the extent of specialization, but this estimate of \$300,000—\$150,000 less than the estimate for Federation—is based on the demand that now exists for specialization, and, as we have already seen, the chief university men on this continent hold that specialization for the B. A. degree should be lessened, and will be lessened. Hence we may conclude that the expense caused by specialization for the B. A. degree is now at its maximum, though there is, as has been shown, no limit to the expense caused by university or post-graduate work.

LIBRARY.

It has been stated that, "the study of Languages, Literature, History, Philosophy and Civil Polity, by advanced students, should be prosecuted in a thoroughly furnished library of works of reference. The work of the professor should be to direct the extended reading of his students." This is described by the writer from whom I quote as the "modern method," and recommended for honor men in the third and fourth years. Evidently the author is continually confounding well-appointed universities for post-graduate work with colleges in which undergraduate work only is done. I made inquiries in Rochester, Syracuse, Amherst, Boston University, the University of the City of

New York, Yale, Cornell, Columbia and Johns Hopkins, and in none of these universities do *undergraduate* students pursue this method. This is the method pursued by *post-graduate* students. Some of these universities have very large libraries. Yale has 140,000 volumes; Cornell, 98,700 volumes; Columbia, 84,000 volumes, and Johns Hopkins, 33,000 volumes; but the libraries are used mainly by men who have graduated in Arts, and are taking a further special course, or are proceeding to the Ph.D. degree. The question of our ability or inability to purchase a well furnished library for undergraduate work can best be settled by obtaining reliable estimates of its cost. I asked the presidents and librarians of the universities I visited the following question: "What sum is required to purchase a good working library for an undergraduate college, with an attendance of from 200 to 300 students?" The lowest estimate for such a library was \$3,000, the highest, \$5,000. Dr. Gilman, President of Johns Hopkins, and the Librarian of Columbia University, mentioned a similar sum, viz., \$5,000. "For \$5,000," said Dr. Gilman, "and a small annual sum for the purchase of the latest works, you can get such a library as you require—but you must put brains in the selection. Some one must purchase your books who knows what to buy. Not a dollar must be spent in buying a useless book."

Dr. Hall, Chancellor of the University of the City of New York, holds the view that each pro-

fessor should have a small but well-selected library under his own control ; and that he should hand a book to a student when he thinks proper. In Dr. Hall's opinion, apart from the regular text-books and such books as the professor may direct his attention to, the reading of the students should be limited ; as in the undergraduate stage of his development he is apt to make his reading a dissipation rather than a discipline. The other professors with whom I conversed hold the same view. " My students," said Dr. Harris, " have no time for general reading nor do they need many books. I am their library, so far as a library is needed in my department."

EQUIPMENT OF THE SCIENCE DEPARTMENT.

In nothing, perhaps, have we been more widely misled than with respect to the cost of scientific apparatus. One writer states that " All the resources of all the universities in Ontario, clubbed together, are not sufficient to equip the single department of Practical Science." All the writers who advocate Federation have followed in the same strain ; but none have submitted from competent authorities estimates of the cost of apparatus. The vagueness of such general statements must be my excuse for inviting your attention to this question in detail.

Apparatus must be used for instruction in the following subjects :

1. *Physics.*

2. *Chemistry*, including Organic and Inorganic Chemistry, Qualitative and Quantitative Analysis.
3. *Minerology*, including Crystallography, Descriptive Mineralogy, Blow-pipe Analysis and Assaying.
4. *Natural History*, including Biology, Botany, and Zoology.
5. *Geology*, including General Geology—that is, Historic and Dynamic Geology and Lithology.

Now, what is the cost of apparatus required to equip in these subjects an undergraduate college with an attendance of from two hundred to three hundred students?

Before we know what apparatus to purchase, we must ascertain clearly two things: (a) The attainments of the students; and (b) The time at their disposal.

The students who enter our colleges range in age, say from sixteen to twenty-one. They pass on entering the matriculation examination. These students are divided into two classes, viz., pass men and honor men. The honor student must, in addition to taking the pass course, attain to special proficiency in special subjects. The Science Department must, therefore, be equipped for the honor man—equipping it for him you equip it for all below him.

TIME AT THE STUDENT'S DISPOSAL.

These young men spend four years in studying for the degree of Bachelor of Arts. Four years of

seven months each—that is, twenty-eight months of actual time spent in college work. A student learning to handle scientific apparatus may be compared, for the sake of illustration, to a young man learning some manual craft. A boy who learns the trade of carpenter, blacksmith, mason, or watchmaker, spends ten hours a day, six days in the week during four years of twelve months each in learning the mechanical part of his trade—that is to say, in learning how to handle apparatus. You give your university man two years and four months of actual time for all the subjects in the course. He must study the theory of the sciences as well as learn how to illustrate them by experiment. Now, the question is what apparatus is required for the instruction of students of such attainments during the time at their disposal—that is, during four college years, equivalent to twenty-eight months of actual time?

WHAT IS REQUIRED IN PHYSICS?

Out of the twenty-eight months allotted to actual college work for obtaining the degree of B. A., suppose that an honor man in the Department of Physics should spend eighteen months in that subject alone, equivalent to a little more than two and a half college years. No student could spend that much time on one subject and do justice to the rest of his course. But I make the supposition, that the estimate may be above, rather than below, what is required. Of that eighteen

months, seven months, equivalent to one college year, would be spent in obtaining a general knowledge of the subject, and no apparatus would be required beyond that used by the pass man. The apparatus required for this general course could be purchased for \$3,000. But this is only pass work, and the Science Department must be equipped for the honor man. Suppose that an honor student in Physics, after spending seven months in obtaining a general view of the subject, should spend the remaining eleven months, equivalent to more than a year and a half of college time, in the study of some special branch--Magnetism, Electricity, Heat, Acoustics, or Optics--any one of which may be selected by the professor to train the student in the methods of physical inquiry, and to introduce him into the knowledge of physical measurements. The apparatus required for this special work is the chief instruments for physical measurement, and an expansion of them in the special subject selected by the professor for illustration of the methods of physical inquiry. The addition to our apparatus for this advanced course may be purchased for \$4,000. Add \$7,000 worth of apparatus to what is now in our Laboratory, and you will have all that can be used by the most brilliant honor man in the undergraduate course in the subject of Physics.

CHEMISTRY.

In all other departments the apparatus is much less costly. We have already seen that the addi-

tion to what is now in our Laboratory of all the necessary chemical apparatus can be purchased for \$1,000 (see page 15). The fact must not be overlooked that students pay fees for apparatus, and are responsible for damage and breakages. Add \$1,000 worth of apparatus to what we have now, and, with careful management, the fees will maintain the efficiency of this department.

MINERALOGY.

In Mineralogy we are nearly supplied. Some assay furnaces are required, a set of goniometers, and a cabinet of hand specimens of minerals. Six or seven hundred dollars would cover the necessary expense for this subject.

NATURAL HISTORY.

All that need be added for instruction in Natural History is a set of microscopes, costing about \$300.

GEOLOGY.

The Geological Department is well supplied with cabinets. About \$600 or \$700 is required to purchase lithological microscopes.

My authority for these figures is the Dean of our Science Department. Dr. Haanel states that \$10,000 worth of apparatus, added to what is now in our Laboratory, and \$1,000 annual outlay to maintain it, will put us in a position, with respect to apparatus, to do as good work as can be done on this continent or in Europe, because that sum

would furnish our laboratories with all the apparatus that could be used in the undergraduate work for purposes of instruction.

I obtained estimates from President Gilman, Dr. Howell and Dr. Kimball, of Johns Hopkins ; Dr. Chandler, of Columbia ; Prof. Chittenden, of the Sheffield School of Science, Yale ; Prof. Cooke, Director of the Chemical Laboratory, Harvard, and Prof. Harris, of Amherst. In no instance were the estimates more than \$10,000. Each one, however, prefaced his statement, by saying that everything depended upon the person who buys and uses your apparatus. Some professors have the power of doing much with little, others will spend a great deal of money and then accomplish nothing. When I put my question to Dr. Chandler, Dean of the School of Mines, of Columbia University, he replied, using, as nearly as I can recollect, the following words : " Everything depends upon your professor. One man will do more work with a paving stone than another man will accomplish with \$1,000 worth of apparatus. I give a full course of lectures on Physics and Chemistry, at the College of Physicians and Surgeons. The professors take the fees for their pay but they must purchase their own apparatus. It is, therefore, to my interest to purchase no more than is absolutely necessary, as the less expense I have to bear the more money I have left. Yet it is to my interest to purchase all that is necessary, as the more clear and interesting I make my lectures and the better

they are illustrated by experiment the more students attend. For a full course of lectures in Physics and Chemistry it has cost me about \$5,000, in apparatus. I prefer a small annual sum for outlay in apparatus to large sums expended at long intervals. You can equip a college which does undergraduate work only with all the apparatus necessary for scientific teaching for \$10,000 and a small annual outlay to sustain it. But," added Dr. Chandler, emphatically, "you must have the right man to purchase and use your apparatus. You must have the right man."

Dr. Harris, of Amherst, in reply to my question about outlay for apparatus, began as did all others, "Everything depends upon your man." Foolish expenditure, he said in substance, has been the order of the day. Thrice dollars out of every four expended for scientific apparatus has been money thrown away. Many professors do not know what they want, and they buy for the purpose of making a display. They get expensive pieces of apparatus which they do not know how to use, and which, therefore, soon get out of order. But they put the price in the papers, and people think the college must be a great institution, because the apparatus cost so much. Other professors have scientific hobbies, and expend money for apparatus which can be of no benefit to the students. The public pay the bill, and imagine that they are making provision for the higher education of their sons, when they are only paying fancy prices for scientific

hobby-horses. "For \$8,000 or \$10,000," said Professor Harris, "and with a yearly outlay of about \$1,000, you can get all the apparatus necessary, if you have the right man."

Other advantages claimed for Federation, other statements made respecting our inability to give instruction in all the subjects belonging to a full undergraduate course will be found as visionary and as erroneous as those which have been to-night examined. In view of these facts, it becomes us to pause and consider whether we effect a saving and better ourselves educationally by accepting Federation, which involves the loss of our charter and the limitation of our work; or whether by maintaining our own autonomy, independent of state influence, we shall not, at a less cost, be able to do more effective work and accommodate ourselves in educational methods, more to the needs of the Church and the Country.

If our Alma Mater, in which we are so deeply interested, to which we confess ourselves indebted, has not been as successful in the past as some would allege, which I utterly deny, let us seek for the true causes of this want of success, and do our duty by removing them. Let us build up our University into what it ought to be, rather than relinquish the successes already achieved and destroy our independence by venturing upon an untried educational policy, which at the very beginning will, as has been shown, cost us more than to maintain Victoria in independence, and to make her thoroughly efficient.